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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/625,769	07/26/2000	Chiyoaki Iijima	9319S-000142	7886

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EXAMINER

SCHECHTER, ANDREW M

ART UNIT

PAPER NUMBER

2871

DATE MAILED: 04/11/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/625,769

Applicant(s)

IJIMA, CHIYOAKI

Examiner

Andrew Schechter

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☒ Interview Summary (PTO-413) Paper No(s). 2.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "LCD with diffuser between liquid crystal panel and reflector, using large diffuser-reflector distance to reduce parallax"

Response to Arguments

2. Applicant's arguments filed 29 January 2002 have been fully considered.

As noted in the Interview Summary, Paper No. 7, the previous rejections under 35 U.S.C. 112, first paragraph, are withdrawn.

The previous rejections under 35 U.S.C. 103 relied on the teachings of *Mitsui* and/or *Jones* that it would be obvious to optimize the values of the diffuser haze and the diffuser-reflector distance. However, *Mitsui* explicitly teaches optimizing by making the diffuser-reflector distance smaller, and *Jones*' teaching is not specific. Therefore, neither would make it obvious to one of ordinary skill in the art to choose the diffuser-reflector distance and haze value to satisfy the limitations of claim 1. The previous obvious-type rejections are therefore withdrawn.

Referring to *Weber*, the applicant states that *Weber* is silent on the distance between the diffuser and reflector, and then proceeds to state that "the distance between the reflective polarizer and the diffuser is too close to satisfy the claimed relationship." These statements appear to be contradictory, unless the applicants know from some other source what this distance is. If so, the examiner would appreciate

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being informed as to the dimensions in *Weber's* device. This point is also relevant to rejections under 35 U.S.C. 103 made below.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 12, 14, and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by *Weber et al.*, U.S. Patent No. 5,686,979 (already of record).

Weber discloses [see Figs. 9 and 11, col. 11, lines 42ff, for instance] a first means [142] including a plurality of electrodes arranged in a matrix, for changing a polarization direction of incident light depending on a voltage applied thereto; a second means [134] for scattering the light such that light that passes through the electrodes is mixed; and a third means [148 when in reflective mode] for reflecting the mixed light toward the first means. The reference does not explicitly describe the light scattered by

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the optical diffuser [134] as "mixed"; however, the examiner understands this to be an inherent feature of light passing through a diffuser, light being redirected from different directions so that it becomes "mixed", and note that light does reach to nearby pixels [col. 13, lines 18-28]. Claim 12 is therefore anticipated.

Weber also discloses a fourth means [140 and 144] absorptive polarizers between the first and third means, including a first element [140] and a second element [144]. Claims 14 and 15 are therefore anticipated.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Weber* as applied to claim 12 above, and further in view of *Ouderkirk, et al.*, U.S. Patent No. 6,124,971.

Weber discloses a liquid crystal panel [142], a light reflector [148], and a light diffuser [134] as discussed above. *Weber* does not explicitly disclose that the diffuser has "forward scattering characteristics" or that the haze and distance satisfy $H > -200d + 140$.

Ouderkirk teaches using a diffuser "with a high degree of forward scattering" in an analogous context [col. 3, lines 12-15], and it would be obvious to one of ordinary

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skill in the art to do so in the device of *Weber*, motivated among other reasons by *Ouderkirk's* teaching that this is equivalent to low reflectivity, so the light will be efficiently utilized.

Weber does not appear to disclose explicitly the distance between the diffuser and the reflector; however, this distance is at least the thickness of the two substrates [150 and 152]. Using conventional substrates with thickness of about 1.1 mm (as would be obvious to one of ordinary skill in the art, motivated among other reasons by the desire to use conventional, readily available materials, standard processing equipments, etc.) would result in a distance d which would satisfy the inequality of claim 1 for any value of the haze H between 0 and 100. (Note that *Weber* discusses minimizing this distance by eliminating the redundant reflective polarizer [144], an approach opposite to the prescription of the present specification. Nonetheless, it appears that the device of *Weber*, constructed with conventional materials, satisfies the inequality of claim 1 with a large margin of error.) Claim 1 is therefore unpatentable.

7. Claims 2, 3, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Weber* and *Ouderkirk* as applied to claims 1 and 12 above.

Weber does not disclose color filters in its liquid crystal panel [142]. However, the examiner takes official notice that such (red, green, and blue) color filters are well-known and conventional and it would be obvious to one of ordinary skill in the art to include them, motivated by the desire to create a color display. These color filters would then be a fourth means, and the optical diffuser [134] would mix these colors to obtain white light (as described in the present specification, since the inequality of claim

1 is met, see above), with the white light being reflected and colored again. Claims 2, 3, and 13 are therefore unpatentable.

8. Claims 4, 7-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Weber* and *Ouderkirk* as applied to claim 1 above.

Weber discloses an absorptive polarizer [140] between the liquid crystal panel and the reflector, so claim 4 is unpatentable. *Weber* also discloses a reflective polarizing plate [144] between the polarizer and the reflector, with transmission axes coinciding, so claims 7 and 10 are also unpatentable.

Weber also discloses a polarizer [138] on the front side of the liquid crystal panel, the device is either reflective or transfective, and mentions typical uses for optical displays such as this are computers, calculators, digital watches, etc. [col. 1, lines 33-35] so claims 9, 11, and 8 are unpatentable.

9. Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Weber* in view of *Ouderkirk*, and further in view of *Broer et al.*, U.S. Patent No. 6,359,670.

(The device of *Weber* in view of *Ouderkirk* as applied to claim 1 above places the illuminating device behind the light reflector indicated above [146, 148]. However, the device of *Weber* in view of *Ouderkirk* can be matched to the claim language in the following way as well.)

Weber discloses a liquid crystal panel [142] and a light diffuser [134] as discussed above with regard to claim 1. *Weber* discloses an illuminating device [132] and suggests a variety of possibilities [col. 11, lines 61-64] without explicit details. The

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examiner takes official notice that it would be obvious to one of ordinary skill in the art to use a conventional backlight structure as shown in Fig. 1 of *Broer*, which has a light source [10] introducing light into a light guiding member which has a light reflector [11] on its bottom surface. (This structure is well-known and has advantages such as being thin and having efficient use of light due to the reflector.) When the device is in transfective mode, therefore, this element [11] acts as the light reflector of claim 1. The illuminating device is then between the light diffuser and the light reflector.

Ouderkirk teaches the use of a forward-scattering diffuser as discussed above, and the inequality is satisfied by *Weber* as discussed above (more so, due to the additional thickness of the light guide being between the reflector and the diffuser. Claims 1 and 6 are therefore unpatentable.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 6,239,852 to *Oono et al.* teaches an optimization of the diffuser-reflector distance, t , and the diffuser haze, H_z , specifically $H_z < 40/t$. However, this teaching relates to a structure in which the liquid crystal material is between the diffuser and the reflector, so it would not be obvious to apply this teaching ($H_z < 40/t$) to a device having the diffuser between the liquid crystal and reflector.

U.S. Patent No. 6,124,905 to *Iijima* discloses a device with the structure of claim 1, haze values of 5 to 85, and diffuser-reflector distances of 0.3 to 2 mm, which would

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anticipate claim 1; however, since the inventive entity of this patent is identical to the present application, it is not prior art under 35 U.S.C. 102(e).


U.S. Patent No. 6,184,949 to *Cornelissen et al.* discloses [see Fig. 3] a second means for scattering light so that it is mixed, analogous to that used in the present invention, but does so in the context of a PDLC (diffusive scattering) device, rather than an LCD based on rotating the polarization of the incident light.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (703) 306-5801. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Sikes can be reached on (703) 308-4842. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 746-4711 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


Andrew Schechter
April 5, 2002


TOANTON
PRIMARY EXAMINER